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New Carventinae from Taiwan and Japan I. (Heteroptera, Aradidae)

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A b s t r a c t : A new genus of apterous Carventinae, *Taiwanaptera* nov.gen. with the species *T. glabra* nov.sp. is described and figured. Further new species are *Carventus insularis* nov.sp. and *Notoplocaptera taiwanica* nov.sp. All three taxa are recorded from Taiwan and Japan. The first record of the female *Carventus taiwanensis* is reported from Taiwan.

K e y w o r d s : Heteroptera, Aradidae, Carventinae, *Taiwanaptera*, new genus, new species, Taiwan, Japan.

Introduction

The subfamily Carventinae of the flat bug family Aradidae is poorly represented in the Palaearctic Region. Only three species of the genus *Carventus*, which is predominantly distributed in the Tropics, were known until recently from mainland China and the islands of Hainan and Taiwan: *C. sinensis* KORMILEV 1969, *C. taiwanensis* KORMILEV 1969 and *C. hainanensis* LIU 1981 (KORMILEV & FROESCHNER 1987) and two species of the genus *Libiocoris*: *L. sinensis* BAI et. al. 2006, *L. heissi* BAI et al. 2006. Last year the new apterous genus *Crassocoris* containing the single species *hsiaoi* from Hainan Island was described (BAI et al. 2007).

This small number of Carventinae certainly does not represent the actual fauna of the subtropical part of Eastern Palaearctics and many more taxa could be expected, when adequate collecting methods are applied. Now further material is available and proved to contain several new taxa, of which – as a first contribution – three are described below.

Material and Methods

This study is based on material preserved in the collection of the first author which was mainly collected by the well known coleopterologist Dr. A. Smetana (Ottawa) and the German entomologists J. & S. Klapperich. Rich material from Japan was available to the second author for this study. The depository of types is as follows:

CEHI Collection Ernst Heiss, Innsbruck, Austria.

ELEU Entomological Laboratory, Faculty of Agriculture, Ehime University, Matsuyama, Japan.

ELKU..... Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan.

NSMT Department of Zoology, National Science Museum, Tokyo, Japan.

NIAES..... National Institute for Agro-Environmental Sciences, Tsukuba, Japan.

ICMI..... Itami City Museum of Insects, Hyogo Prefecture, Japan.

As the body of Carventinae – and particularly that of apterous species – is mostly covered by a waxy incrustation which obscures the cuticular structures, it was removed before investigation.

Measurements were taken with a micrometer eyepiece, 40 units = 1 mm unless otherwise stated.

Taxonomy

Carventus insularis nov.sp. (Figs 1, 2, photo 1)

Material examined: Holotype female, Taiwan, Nantou County, Huei-Sun nr. Meiyuan 24.VII.2003, C. Danilov; Paratypes: 1 ♀ Taiwan, Shanmei 600m, 2.V.1977 J. & S. Klapperich, 1 ♀ Taiwan, Hori (Puli) 750m, 22.VIII.1942 J. Gressitt; 1 ♀ Japan, Kyushu, Miyazaki Prefecture env. Okawachi, 3.VIII.2001 M. Ertl (all CEHI); 1 ♀, Japan, Honshu, Wakayama Prefecture, 3.V.1964 S. Gotoh (ICMI); 3 ♀, Japan, Shikoku, Kagawa Prefecture Ayauta-gun, Ayakami-chô, 7.V.2002 S. Nagashima (ICMI).

Diagnosis: Related to *Carventus hainanensis* sharing the general habitus and the position of spiracles II+III ventral and not visible from above. It is however distinguished by narrower pronotum and differently shaped anterolateral pronotal lobes, by shorter antennae and less projecting paratergites VIII in female.

Description: Female elongate ovate, macropterous; surface of body glabrous, legs and antennal segments I+II finely granulate, colouration reddish brown.

Head. Slightly longer than wide across eyes (33/31), genae projecting over clypeus, their apices rounded, reaching about 3/5 of antennal segment I; antenniferous lobes diverging with acute apices; antennae $1.84 \times$ as long as width of head, segment I club shaped and thickest, II thinner and shortest, III thin and as long as I, IV fusiform with pilose apex; relative length of segments I:II:III:IV = 32:22:32:28. Eyes subglobular, postocular tubercles distinct and exceeding the outer margin of the eyes, strongly converging posteriorly to narrow collar. Vertex longitudinally raised, with two (1+1) ovate smooth depressions laterally. Rostrum arising from a slit-like atrium, shorter than head, rostral groove closed posteriorly.

Pronotum. About $1.24 \times$ as wide (posterior lobes) as long at middle (62/40), anterior lobes narrower (50); anterolateral lobes rounded, laterally concave, followed by a triangular tooth and sinuate lateral margins posteriorly. Collar consisting of a smooth ring like anterior structure and a granulate triangular part which is separated from the two median sclerites with ovate callosities by a deep groove; inner margin of anterolateral lobes sinuate and also delimited by a deep groove which meets posteriorly with the smooth transversal depression between anterior and posterior part of pronotum; the latter is raised and granular, constricted and depressed along a transversal line before posterior margin, which has two triangular projections and is straight along the scutellum.

Scutellum. Triangular, about $1.7 \times$ as wide as long (38/22), lateral margins convex, apex rounded; disk with a basal transversal ridge and a smooth longitudinal groove with a feeble carina, granulate laterad.

Hemelytra. Basolateral margin of corium reflexed and elevated, posterior margin sinuate, reaching about $\frac{1}{2}$ of dorsal laterotergite (dltg) II. Membrane hyaline, covering the tergal plate, extending to $\frac{1}{3}$ of mediotergite (mtg) VII.

Abdomen. Elongate ovate, posterolateral angles of dltg II-VI slightly producing, VII subangular, ptg VIII with rounded apices, nearly as long as the tricuspidate tergite IX. The lateral margin and its projections are formed by the reflexed ventral laterotergites (vltg) which are visible from above and also finely granulate. Spiracles II+III ventral and not visible from above, IV-VII lateral placed on reflexed vltg IV-VII, VIII dorsolateral, all visible from above.

Legs. Long and slender, unarmed, fore tibiae with a preapical comb, hind tibiae bent, claws with fine curved parempodia.

Male. Unknown

Distribution. So far recorded from Taiwan and the Japanese Islands of Honshu, Kyushu and Shikoku.

Measurements. Length 5.0 mm, width of abdomen 2.2 mm, paratypes. 5.0 mm (Japan), 5.0, 5.2 mm, width of abdomen 2.25, 2.3, 2.33 mm respectively.

Etymology. named after its occurrence on the islands of Taiwan and Japan.

Discussion. Of the three species of *Carventus* known to date from Eastern Palearctic Region (including tropical Southern China) (HEISS 2001), *C. sinensis* from Guangdong, China and *C. taiwanensis* from Taiwan share the lateral position of spiracles III-VIII, whereas only IV-VIII are lateral and visible from above in *C. hainanensis* and *C. insularis* nov.sp. Furthermore *C. sinensis* shows a more robust wider pronotum with differently shaped anterolateral lobes of pronotum, longer genae (Fig.4) and terminal segments of female (Fig. 5). *C. taiwanensis* has a much wider pronotum and also different paratergites (ptg) VIII and tergite IX in females (Figs 6, 7).

Therefore the closest species is *C. hainanensis* from which *C. insularis* nov.sp. is distinguished by shorter antennae (ratio length of antennae / width of head 1.84 against 2.12), narrower and rounded not sinuate anterolateral pronotal lobes (Fig. 8) and different shape of terminal segments in female (Fig. 3). The specimen from Japan (Fig.2) shares all essential characters of those from Taiwan and is therefore regarded as conspecific. It can be expected, that *C. insularis* nov.sp. has a wider distribution along the East Asian belt of islands.

***Carventus taiwanicus* KORMILEV 1969 (Figs 6, 7, photo 2)**

The description was based on a single male from Urai-Rimogan in Taiwan and no further record is published since. A single female labeled: "Taiwan, Alishan 2400m, 10 VI 1977 J. & S. Klapperich leg." represents the hitherto unknown opposite sex which is briefly described below.

Description. Body ovate, uniformly light brown, the whitish incrustation partly obscuring the granulate surface. Membrane translucent, whitish; dark brown to blackish are the smooth median spot on pronotum, the scutellum laterad of median ridge, the median part of mediotergite (mtg) VII and the venter except vltg's and head.

H e a d . Longer than wide (38/34), genae slightly projecting over clypeus, contiguous apically; antenniferous lobes diverging, apices rounded; antennae (segments III+IV missing) with segment I thick, II thinner and much shorter, relative length of I : II = 32 : 22. Eyes oval, postocular tubercles subacute exceeding the outer margin of eyes. Rostrum arising from a slit like atrium, rostral groove shorter than head with carinate lateral margins, closed posteriorly.

P r o n o t u m . $1.85 \times$ as wide as long (74/40), anterolateral lobes expanded laterally and rounded, lateral margins bisinuate with a tooth like projection, humeri widely rounded. Collar ring like, separated by a deep transversal groove from anterior lobe of pronotum, the latter with a pair of larger tubercles anteriorly and a single one on posterior margin, flanked by two pairs of oblong smooth callosities which are surrounded laterally by granulate crescent like ridges. Transversal depression between anterior and posterior part of pronotum deep, the smooth darker spot at middle extending posteriorly to $\frac{1}{2}$ of posterior lobe, which is raised and granulate. Posterior margin slightly sinuate at middle.

S c u t e l l u m . Nearly twice as wide as long (42/24), lateral margins and apex rounded, disk with a T-shaped ridge, granulate laterad.

H e m e l y t r a . Corium very short, basolaterally reflexed and elevated; membrane reaching $\frac{1}{3}$ of mtg VII with indistinct traces of veins.

A b d o m e n . Ovate, posterolateral angles of dltg II-VI only feebly projecting, VII rounded, the reflexed vltg II-VII are visible from above and bear the spiracles III-VII, spiracle II ventral and not visible from above, VIII terminal. Ptg VIII with rounded apices projecting over dltg VII, reaching $\frac{1}{2}$ of tricuspidate tergite IX.

M e a s u r e m e n t s . Length 5.5 mm; width of abdomen 2.6 mm.

D i s c u s s i o n . This species is only known from the male holotype and the above-mentioned female is the first record of this sex. *C. taiwanensis* is easily recognized and distinguished from the other known East-Palaearctic species by its wide pronotum, the short genae and the sinuate posterior margin of pronotum.

***Taiwanaptera* gen. nov.**

Type species: *Taiwanaptera glabra* nov.sp.

D i a g n o s i s . The most striking character of the apterous genus *Taiwanaptera* is the mesonotal sclerite with a distinct scutellar projection. This is shared only by a few other Carventinae from Oriental- and Australian Region e.g. *Apteraradus* DRAKE 1957 (Malaysia, Thailand, Vietnam and Sunda Islands), *Eurycoris* KORMILEV 1957 (New Guinea, Australia), *Carventaptera* USINGER & MATSUDA 1959 (New Zealand) and *Paracarventus* KORMILEV 1964 (Australia).

It is distinguished from the habitually closest related genus *Apteraradus* by the head as long as wide ($1.7 \times$ longer than wide in *Apteraradus*), spiracles IV-VII lateral and visible from above (VI-VII in *Apteraradus*), elevated and posteriorly sloping fused mtg I+II (same level as scutellum) and the presence of two conical tubercles on sternite VII in male (lacking in *Apteraradus*). *Euricoris* has laterally expanded lobes on pro-, meso- and metanotum and sternite VII of male bears 4 tubercles. The monobasic genera *Carventaptera* and *Paracarventus* are not considered for biogeographical reasons.

Description. Apterous. Body subrectangular and attenuated anteriorly; surface of body and appendages shiny (incrustation removed) with fine granulation.

Head. As long as wide, clypeus elevated with a dorsal tubercle anteriorly; genae slightly longer than clypeus. Antenniferous lobes divergent, antennae slender with segment I thickest, III longest: Eyes oblong, postocular tubercle blunt, not or hardly reaching the outer margin of eyes; vertex raised and granulate. Rostrum shorter than head, arising from a slit like atrium, rostral groove deep and closed posteriorly.

Pronotum. Subrectangular, posterior margin convex, collar ring like ending in a distinct round tubercle laterad; lateral margins slightly concave, anterolateral lobes rounded, not reaching anterior margin of collar.

Mesonotum. More than twice as wide as long, lateral lobes rounded, posterior margin first concave then straightly converging posteriorly forming the triangular scutellar projection, the latter reaching the transversal suture between metanotum and fused mtg I+II.

Metanotum. Formed by two ovate sclerites, its surface is granular with smooth callosities.

Abdomen. Mtg I+II fused, trapezoidal with deeply depressed apodemal impressions (glabrous spots), anterior margin strongly raised, delimited by a smooth transversal ridge, then sloping posteriorly to lower level of tergal plate; the latter formed by mtg III-VI with a longitudinally elongate rounded elevation which is highest on mtg IV and bears the dorsal scent gland openings. Dltg I+II fused, III-VI subrectangular, VII pentagonal, their lateral margin slightly reflexed.

Venter. Prosternum triangular with granulate surface, meso- and metasternum smooth and shiny with a depressed mat oval spot, fused sternites I+II smooth and fused to sternite III, delimited by a transversal groove, sternites III-V with a median mat spot and a depressed furrow laterad. Spiracles II+III sublateral but not visible from above, IV-VII lateral and visible, VIII terminal.

Legs. Femora and tibiae slender, unarmed, trochanters distinct. Tarsi two-segmented, claws with thin curved parempodia, preapical comb present on fore tibiae.

Genitalic structures. Male pygophore globose, attenuated posteriorly, surface granular; parameres flat, inner face with dispersed setae.

Etymology. Refers to the country of origin and its apterous condition.

***Taiwanaptera glabra* nov.sp. (Figs 9-12, 18, photos 3-5)**

Material examined: Holotype male, Taiwan, Taifung Hsien, Hsinkingshan above Chungkang 900m, 19.IV.1998 A. Smetana (T 184); paratypes: 1♂ Taiwan, Taichung Hsien, Anmashan 2230m, 12.V.1992 A. Smetana (T 127), 1♂ Taiwan, Alishan 2400m, 14.IV.1977 J. & S. Klapperich, 1♀ Taiwan, Kiaoshiung Hsien, Tengchih 1610m, 24.IV.1990 A. Smetana (T 20); 1♀ Taiwan, Fenchihu 1400m, 3.VI.1977 J. & S. Klapperich. Two larvae L5 are from the holotype locality (CEHI); 1♂ 1♀, Taiwan, Nantou County, Nchu Hui Sun Forest Rec. Area, 770m, 22.V.1997 C.W. & L.B.O' Brien (CEHI); 1♂ 4♀, Taiwan, Takao Hsien, Naihonrokugoe, Keinanzan-Fujieda, 18 VII 1982 T. Esaki (ELKU); 1♀, Japan, Kyushu, Nagasaki Prefecture, Mt. Unzen-dake, 1 VIII 1935 E. Suenson (ELKU); 1♂, Japan, Okinawa Prefecture, Okinawa Is., Kunigami-son, Benoki dam, 18 VI 1999 K. Takahashi (ICMI); 1♂, Japan, Okinawa Prefecture, Okinawa Is., Kunigami-son, Yona, 5 II 1998 K. Takahashi (ICMI); 1♀, same locality as above, 18.VI.1994 K. Okada (ELEU); 3♂♂ 2♀♀, Japan, Okinawa Prefecture, Okinawa Is., Kunigami-son, Mt. Yonaha-dake, 4.X.2002 T.

Yasunaga (ICMI); 1♂, Japan, Okinawa Prefecture, Okinawa Is., Ôgimi-son, 14.IX.2001 K. Takahashi (ICMI); 1♀, Japan, Okinawa Prefecture, Okinawa Is., Motobe-chô, 10.V.2000 S. Inada (ICMI); 1♀, Japan Okinawa Prefecture, Ishigaki Is., Mt. Yarabu-dake, 7.III.2003 T. Nakata (ICMI); 9♂♂ 8♀♀, same locality as above, 9.VI.2003 S. Nagashima (ICMI, CEHI); 1♀, Japan Okinawa Prefecture, Ishigaki Is., Mt. Omoto-dake, 5.IV.2001 T. Ueda (ICMI); 2♂♂ 3♀♀, Japan Okinawa Prefecture, Iriomote Is., Shirahama-rindô, 4.III.2002 S. Nagashima (ICMI); 1♂ 1♀, same locality and collector, 1.III.2002 (CEHI); 1♀, Japan Okinawa Prefecture, Iriomote Is., Ôtomi-rindô, 23.V.2003 T. Tsuru (ICMI); 1♀, Japan Okinawa Prefecture, Iriomote Is., Aira-gawa riv., 6.VI.1998 K. Takahashi (ICMI); 1♀, Japan Okinawa Prefecture, Iriomote Is., Komi, 13-16.III.2002 H. Sugaya leg (ICMI).

D i a g n o s i s . The only species included so far in *Taiwanaptera* can be recognized by the characters given in the generic diagnosis.

D e s c r i p t i o n . Male, apterous. Colour uniformly dark reddish brown, shiny beneath incrustation.

H e a d . As wide as long (44/44), genae slightly exceeding clypeus, which bears a sub-apical tubercle, reaching about $\frac{1}{2}$ of antennal segment I; antennae $2.09 \times$ as long as width of head, segment I slightly clavate, constricted basal $\frac{1}{3}$ smooth, thickened apical $\frac{2}{3}$ densely granulate, II thinner and apically barely wider than at base, III longest, thin and cylindrical with distinct constricted base, IV fusiform. Relative length of I:II:III:IV = 25:17:30:20. Antenniferous lobes diverging anteriorly, blunt; eyes oblong, whitish; post-ocular tubercles distinct not reaching outer margin of eyes, vertex with a posteriorly elevated granulate ridge.

P r o n o t u m . About $2.3 \times$ as wide as long (64/28), collar ring like; lateral margins slightly concave, anterolateral lobes rounded then straight, not projecting over collar, its surface is at a lower level than the laterad ovate elevations of pronotal disk, the latter with a median furrow flanked by two smooth ovate callosities; posterior margin carinate and convex medially.

M e s o n o t u m . About $2.6 \times$ as wide as long (78/30), laterally expanded lobes rounded, posterior margin concave, then posteriorly projecting to form the triangular scutellum; surface rugose laterad of scutellum, the latter with a median posteriorly elevated ridge which shows an indistinct longitudinal furrow medially.

M e t a n o t u m . Formed by two eye shaped sclerites which are separated by the scutellar projection; surface granulate with sickle-shaped smooth callosities on each sclerite.

A b d o m e n . Mtg I+II fused, anterior margin raised, sinuate and carinate, surface smooth and shiny with two larger median and two smaller lateral ovate depressions, sloping from anterior to posterior margin. Tergal plate with a median granulate ridge extending from $\frac{1}{2}$ mtg III to mtg VI. Dltg I+II fused anteriorly reaching to mesonotum; dltg III-VI subrectangular, lateral margins progressively projecting, dltg VII truncate. Spiracles II sublateral and never visible from above, III sublateral but closer to lateral margin, slightly visible in males, spiracles IV-VII lateral and visible from above, VIII terminal on small and slender ptg VIII. Laterad of dltg IV-VII a small rim of the reflexed vltg IV-VII is visible where the spiracles are placed. Venter: Meso- and metasternum, fused sternites I+II and III-VI show a median mat spot, sternite VII of male a pair of shiny round tubercles.

G e n i t a l i c s t r u c t u r e s . Pygophore constricted posteriorly, surface granulate with a dorsal inverted V-shaped suture; paramers flat (Fig. 18), the blade reflexed along anterior margin, inner surface with dispersed setae.

F e m a l e . Basically as the male, lateral margins of abdomen wider and more rounded; ptg VIII triangular, shorter than posteriorly projecting tergites IX+X (Figs 11, 12).

M e a s u r e m e n t s . Holotype male. Length 5.7 mm, width of abdomen across tergite IV 2.7 mm; paratypes male: length 4.6-6.7 mm, paratypes female: length 6.0-7.5 mm, ratio length of antennae / width of head about 1.90, relative length of I:II:III:IV = 22:16:28:18, width of abdomen 3.1 mm.

E t y m o l o g y . Refers to the glabrous surface when the waxy incrustation is removed for better recognizing the cuticular structures.

D i s t r i b u t i o n and **E c o l o g y** . So far known from Taiwan at altitudes from 900-2400m; Japan: Kyushu and the islands of Okinawa, Ishigaki and Iriomote of Ryûkyûs, where adults and larvae were found on decaying branches on the floor of the evergreen forest.

***Notoplocoptera taiwanica* nov.sp. (Figs 13-17, photo 6)**

M a t e r i a l e x a m i n e d : Holotype male, Taiwan, Kaoshiung Hsien, above Tona forest station 1100m, 30.IV.1998 A. Smetana (T 192) (CEHI); Paratypes: 1 ♀, Taiwan, Nantou County, Nchu Hui Sun Forest Rec. Area, 770m, 22.V.1997 C.W. & L.B.O' Brien (CEHI); 1 ♂ 2 ♀ ♀, Taiwan, Kanto, 2.IV.19xx T. Kano (year of the collection is unknown; NSMT); 1 ♂ 1 ♀, Taiwan, Urai-Rimogan, 21.VI.1941 A. Kira (ELKU); 1 ♀, Taiwan, Mt. Taihei, 2200m alt., 28.VI.1941 A. Kira (ELKU); 2 ♂ ♂ 1 ♀, Japan, Honshu, Wakayama Prefecture, Ôtô-mura, Mengawa, 15.VI.1998, S. Gotoh (ICMI); 1 ♀, same locality, 1.VII.1999, S. Gotoh (ICMI); 1 ♂ 1 ♀, Japan, Shikoku, Ehime Prefecture, Uchiumi-mura, 4.XI.1995 M. Sakai (ELEU); 1 ♀, Japan, Ehime Prefecture, Nomura-chô, Nomura-dam, 8-9.X.1994 K. Aita leg. (ELEU); 1 ♂ 1 ♀, Japan, Kôchi Prefecture, Ôdô, Ôtsuki-chô, nr. Kashiwa-jima, 24.VII.1967 M. Miyatake et al. (ELEU); 5 ♂ ♂ 3 ♀ ♀, Japan, Kyushu, Fukuoka Prefecture, Mt. Hikosan, 13.V.1955 T. Esaki et al. (ELKU); 1 ♀, same locality as above, 10.V.1948 R. Matsuda (ELKU); 1 ♂, same locality as above, 8.VII.1988 K. Yasumatsu et al. (ELKU); 1 ♂, same locality as above, 24.IX.1938 Hori and Fujino (ELKU); 1 ♀, Japan, Miyazaki Prefecture, Mt. Ôkue-yama, 22.VII.1971 S. Tawara (NIAES); 1 ♂ 2 ♀ ♀, Japan, Okinawa Prefecture, Okinawa Is., Kunigami-son, Aha, 15.VII.2003 M. Kimura (ICMI); 1 ♂ 1 ♀, Japan, Okinawa Prefecture, Okinawa Is., Kunigami-son, nr Mt. Nishime-dake, 9.IX.2003, S. Arai (ICMI); 1 ♀, Japan, Okinawa Prefecture, Okinawa Is., Kunigami-son, Yona, 17.VII.1965 Y. Hori (ELEU).

The genus *Notoplocoptera* USINGER & MATSUDA 1959 contains presently 8 species of which 4 were described (partly sub *Melvertes*) from Borneo (*N. enigma* USINGER & MATSUDA 1959, *N. mystica* KORMILEV 1968, *N. breviceps* KORMILEV 1983 and *N. draco* VÁSÁRHELYI 1988), one from India (*N. indica* VÁSÁRHELYI 1983), one from Burma (now Myanmar) (*N. malaisei* DRAKE 1957) and two from Vietnam (*N. sternalis* VÁSÁRHELYI 1976, *N. kaszabi* VÁSÁRHELYI 1988).

A key to 6 species was given by VÁSÁRHELYI 1985. In this key, the new taxon runs to *N. sternalis*, however it differs by several characters and for biogeographical considerations it is very unlikely that an apterous species from Vietnam occurs in Taiwan and Japan. Therefore it is described as nov.sp.

D i a g n o s i s . General appearance similar to *N. sternalis* (and *N. kaszabi* which is probably the opposite sex, to be confirmed when more specimens are available), but differs by other proportions of antennal segments, anteriorly narrower median sclerite of meso- metanotum and shorter and wider lateral projections of dltg IV-VII bearing the spiracles.

D e s c r i p t i o n . Male, apterous; body elongate, abdomen subparallel, thorax attenuated anteriorly; surface of body shiny with deep punctures and rugosities, legs and an-

tennae with yellowish curved hairs which are also dispersed along the lateral margins of thorax and abdomen. Colour of body dark piceous, legs, antennae, antenniferous lobes and genae are reddish brown.

Head. $1.3 \times$ as long as wide (58 incl. genae / 42), genae long with rounded apices distinctly projecting over clypeus, reaching $\frac{3}{4}$ of antennal segment I. Antenniferous lobes diverging anteriorly, blunt; antennae $1.69 \times$ as long as width of head (70/42), segment I longest, barrel shaped, smooth at base and apically beset with setigerous tubercles, II and III shorter and thinner with smaller setigerous tubercles, III is the shortest, IV fusiform.; relative length of I:II:III:IV = 27:17:12:15. Eyes globose, slightly stylate; postocular portion of head first forming a rounded lobe with an elevated smooth callosity, then converging posteriorly to narrow collar; two parallel carinae on vertex are bent posterolaterally around these lobes. Rostrum arising from a slit like atrium, rostral groove shorter than head, closed posteriorly.

Pronotum. More than twice as wide as long (66/28) consisting of two elevated lobes separated at middle by a triangular depression widening and sloping anteriorly to the ring like collar at a lower level; lateral margins parallel, then concavely converging anteriorly, anterolateral angle bluntly rounded; anterior margin deeply concave at middle; surface of lateral lobes irregularly rugose, a narrow rim follows the lateral margins on a lower level; median depression with a longitudinal groove flanked by two smooth ovate callosities laterad and a round knob like tubercle on posterior margin.

Mesonotum. About $3.4 \times$ as wide as long (82/24), fused to but separated by deep grooves from pro- and metanotum, consisting of two elevated ovate lobes, at middle with an anteriorly conical smooth ridge which extends along metanotum and fused mtg I+II reaching the anterior margin of tergal plate. Surface of lateral lobes with irregular rugosities, lateral margins subparallel with a narrow rim at a lower level.

Metanotum. Formed by two large oval sclerites laterad of the median ridge which here is wider and subparallel; surface of sclerites rugose as pro- and mesonotum, the rounded lateral margins show a narrow rim at a lower level; inner margins deeply grooved, posterior margin fused to mtg I+II. The median ridge is narrowing at the fused mtg I+II, their posterior margin is concave medially.

Abdomen. Tergal plate with typical pattern of apodemal impressions with callosities surrounded by deep punctures and smooth carinae; scent gland openings on mtg III to V placed on a slightly elevated smooth median ridge which is developed along the whole length of the tergal plate with a thin acute apex anteriorly ending in a rounded elevation posteriorly. Dltg II triangular and not fused to dltg III, III-VI rhomboidal, VII pentagonal. Lateral margins of dltg IV-VII with triangular lateral projections which are the visible reflexed vltg IV-VII on which the spiracles are placed; spiracles II and III also lateral and visible from above, VIII terminal. Venter: prosternum anteriorly deeply puctured, smooth posteriorly with an acute lateral tooth, fused to meso- and metasternum, each separated by a transverse groove; mesosternum medially with a deep round pit, anterolaterally with a blunt, posterolaterally with an acute tooth on both sides directed towards coxae; metasternum bears also a deep round pit, anterolaterally on both sides with a large acute tooth followed by an arched margin with a small rounded knob and a smaller acute tooth posteriorly. Sternite I+II fused, posteromedially depressed, laterally lobate; sternites III-VII with the usual pattern of 2:2:1 apodemal impressions, marked by round callosities which are surrounded by deep punctures, medially with a triangular (on

sternite II, IV, VII) or subrectangular (sternite V, VI) mat spot; sternite VII with two conical tubercles.

Legs. Trochanters fused but sutures visible, claws with thin curved parempodia.

Genitalic structures. Pygophore with a rugose triangular dorsal sclerite, followed by an oval rounded lobe posteriorly, parameres slender with rounded apex, anterior portion closed, inner face with dispersed setae, dorsal face with an elongate depression (Figs 14-17).

Measurements. Length 6.8 mm; width of abdomen 2.7 mm.

Female. General appearance as male, however of larger size: 6.9-7.5 mm.

Etymology. Refers to the host country of the holotype of the new taxon.

Distribution and Ecology. The new species is recorded from Taiwan but is wider distributed in Japan: Islands of Honshu, Shikoku and Kyushu and was found also on Okinawa Island in the Ryûkyûs. According to S. Arai (pers. comm.) it was collected in Okinawa from leaf litter in the evergreen rainforest.

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Zusammenfassung

Aus der in den Tropen artenreichen Unterfamilie Carventinae der Familie Aradidae (Rindenwanzen) sind aus der palaearktischen Region bisher nur 3 Arten der Gattung *Carventus* (*C. sinensis* KORMILEV 1969 vom Festland China, *C. taiwanensis* KORMILEV 1969 von Taiwan und *C. hainanensis* LIU 1981 von der Insel Hainan), 2 Arten der Gattung *Libiocoris* (*L. sinensis* BAI et. al. 2006, *L. heissi* BAI et al. 2006 von China) und *Crassocoris hsiao* BAI et al. 2007 von Hainan bekannt geworden. Diese geringe Artenzahl stellt sicherlich nicht das tatsächlich vorkommende Artenspektrum des subtropischen Teiles der Ostpalaearktis dar, vielmehr ist zu erwarten, daß mit geeigneten Sammelmethoden zahlreiche weitere Arten entdeckt werden können.

In der vorliegenden Arbeit werden folgende aptere Taxa beschrieben und abgebildet, von denen Belege aus Taiwan und Japan vorliegen: *Taiwanaptera* nov.gen. mit der Art *T. glabra* nov.sp.; *Carventus insularis* nov.sp. und *Notoplocaptera taiwanica* nov.sp. Weiters wird der erste Fund des Weibchens von *Carventus taiwanensis* von Taiwan gemeldet.

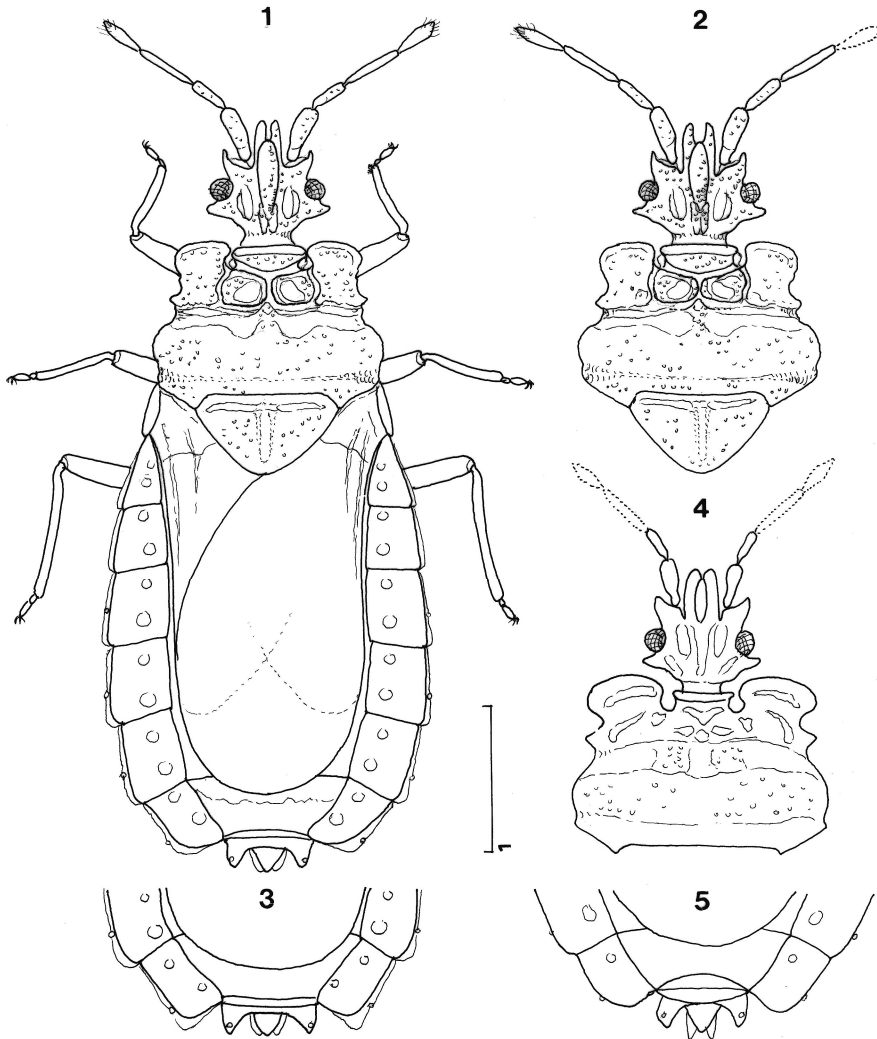
References

- BAI X., HEISS E. & W. CAI (2007): A new apterous genus and species of Carventinae from China (Heteroptera: Aradidae). — Linzer biologische Beiträge **39** (1): 45-50.
- BAI X., YANG Ch. & W. CAI (2006): First record of the genus *Libiocoris* Kormilev 1957 (Heteroptera: Aradidae) from China, with description of two new species. — Zootaxa **1370**: 39-47.
- DRAKE C.J. (1957): New apterous Aradids from the East Indies (Hemiptera). — Philippine Journal of Science **85**: 405-412.
- HEISS E. (2001): Superfamily Aradoidea Brullé 1836. — In: AUKEMA B. & C. RIEGER (eds), Catalogue of the Heteroptera of the Palaearctic Region. Netherlands Entomological Society, Amsterdam. Vol. **4**: 3-34.
- KORMILEV N.A. (1968): Aradidae in the Bishop Museum, Honolulu, III. (Hemiptera-Heteroptera). — Pacific Insects **10**: 575-597.
- KORMILEV N.A. (1969): Aradidae in the Bishop Museum, Honolulu, IV. (Hemiptera-Heteroptera). — Pacific Insects **11** (1): 49-70.
- KORMILEV N.A. (1983): New Oriental Aradid Bugs in the collection of the British Museum (Natural History) (Insecta: Hemiptera). — Journal of Natural History **17**: 437-469.
- KORMILEV N.A. & R.C. FROESCHNER (1989): Flat Bugs of the World. A synonymic list (Heteroptera: Aradidae). — Entomography **5**: 1-246.
- LIU S.L. (1981): New species of Chinese Aradidae (Hemiptera-Heteroptera, Aradidae). — Acta Entomologica Sinica **24** (2): 184-187. (In Chinese with English summary).
- USINGER R.L. & R. MATSUDA (1959): Classification of the Aradidae (Hemiptera-Heteroptera). — British Museum (Natural History), London, 410 pp.
- VÁSÁRHELYI T. (1976): Aradidae from Vietnam in the Hungarian Natural History Museum (Heteroptera). — Acta Zoologica Academiae Scientiarum Hungaricae **22** (3-4): 407-414.
- VÁSÁRHELYI T. (1983): *Melvertes indicus* sp.n. (Heteroptera: Aradidae). — Folia Entomologica Hungarica **44** (1): 201-202.
- VÁSÁRHELYI T. (1985): On *Chinessa furcella* and the genus *Melvertes* (Heteroptera, Aradidae). — Folia Entomologica Hungarica **47** (2): 173-177.
- VÁSÁRHELYI T. (1988): Two new *Notoplocaptera* species (Heteroptera, Aradidae). — Acta Zoologica Hungarica **34** (2-3): 307-311.

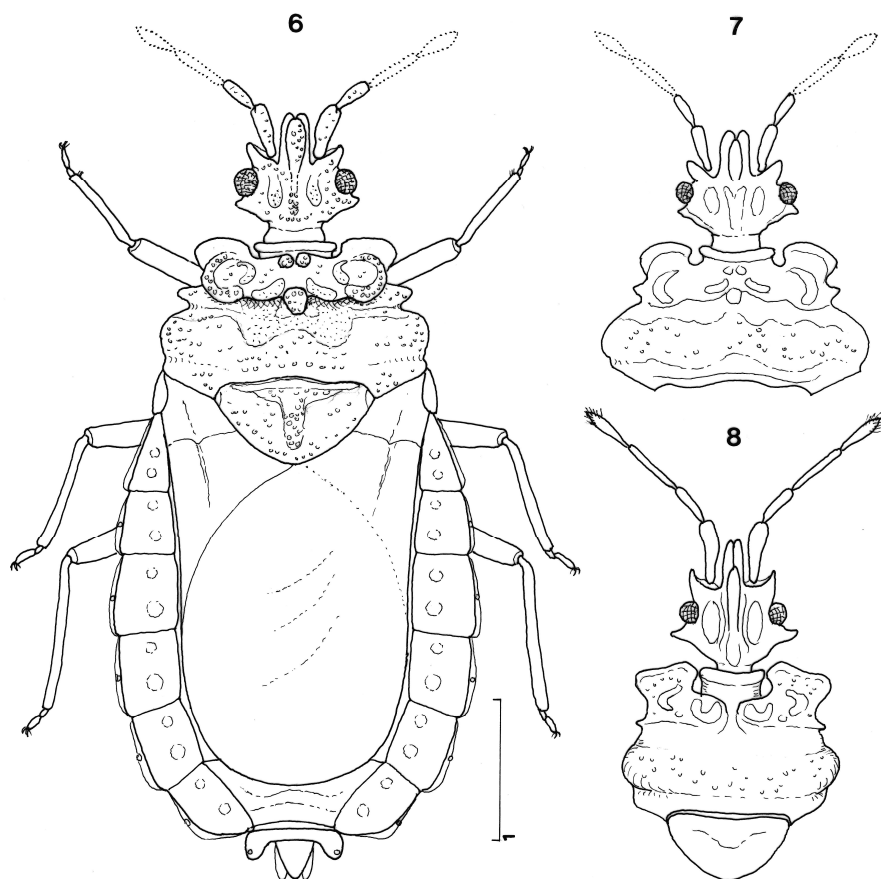
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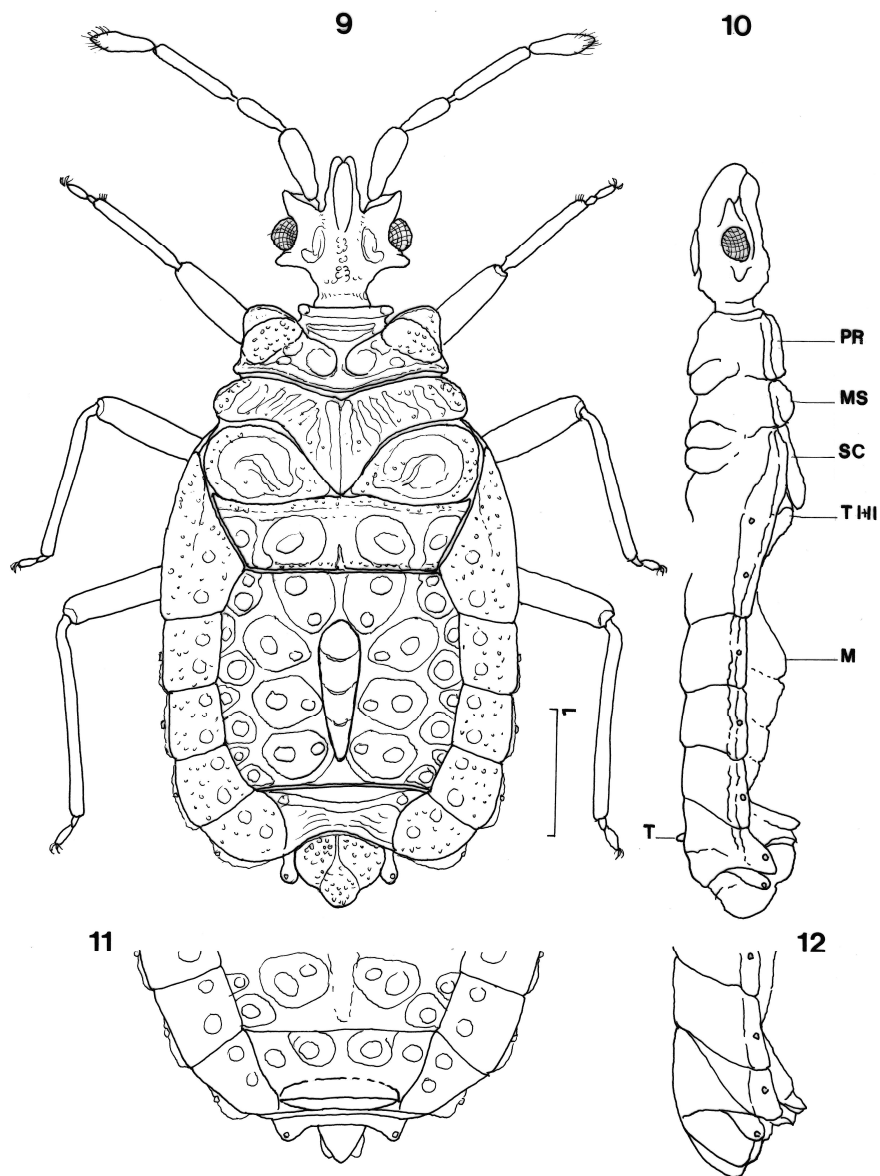
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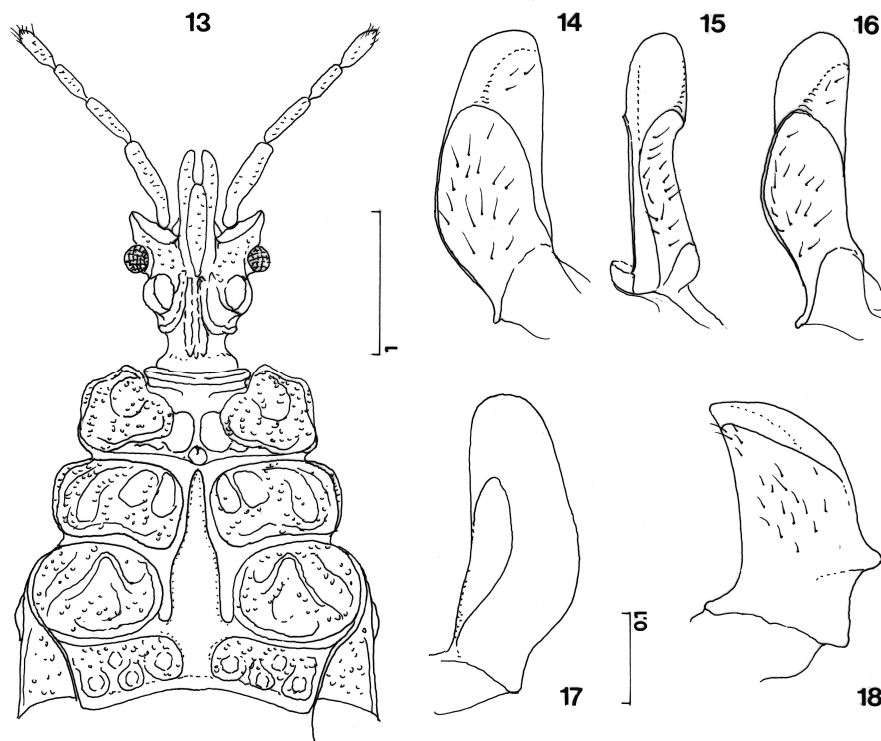
Figs 1-5: *Carventus* spp. (1) *Carventus insularis* nov.sp. holotype ♀; (2) paratype from Kyushu (Japan); (3) *Carventus hainanensis*, holotype ♀, terminal segments (after LIU 1981); (4) *Carventus sinensis*, holotype ♀, head and pronotum; (5) ditto, terminal segments (after KORMILEV 1969). Figs 3-5 are drawn to same scale as Figs 1-2. Scale 1 mm.



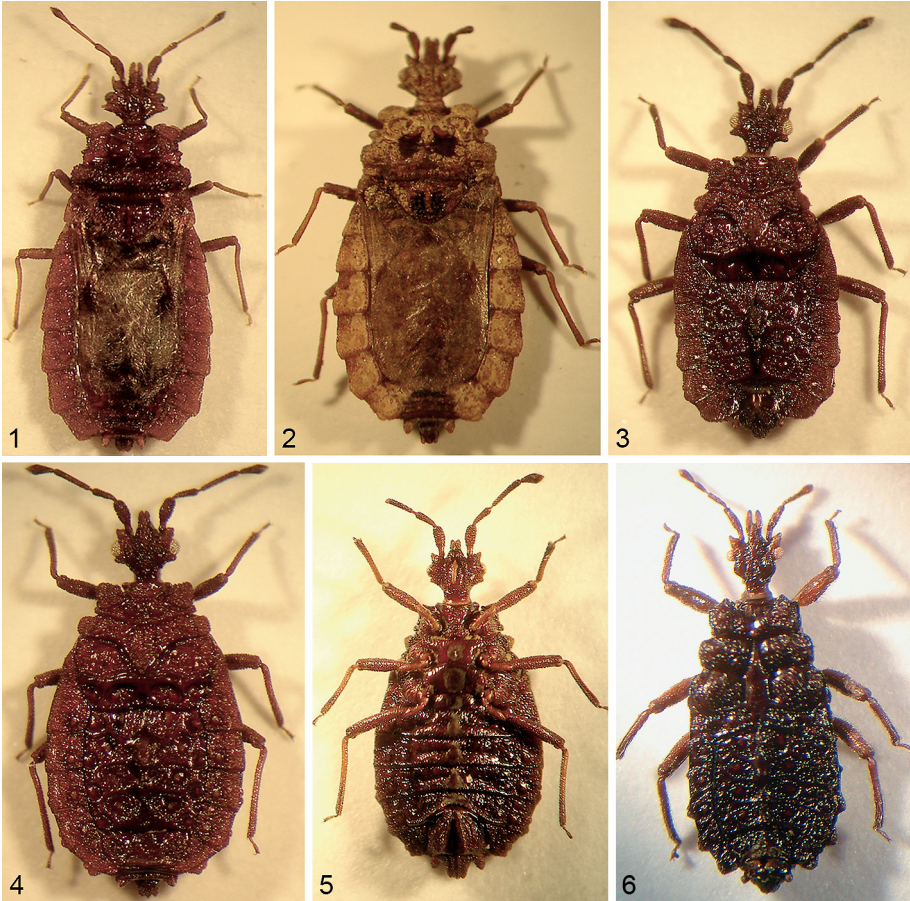
Figs 6-8: *Carventus* spp. (6) *Carventus taiwanensis*, ♀, habitus dorsal view; (7) ditto, head and pronotum of holotype ♂ (after KORMILEV 1969); (8) *Carventus hainanensis*, head and pronotum of holotype ♀ (after LIU 1981). Figs 7, 8 are drawn to same scale as Fig. 1. Scale 1 mm.



Figs 9-12: *Taiwanaptera glabra* nov.sp. (9) holotype ♂, habitus dorsal view; (10) ditto lateral view; (11) paratype ♀, terminal segments dorsal view; (12) ditto lateral view. Abbreviations. M = median elevation on tergal plate, MS = mesonotum; PR = pronotum; SC = scutellar projection; T = tubercles on sternite VII; T I+II = fused mediotergites I+II. Scale 1 mm.



Figs 13-18: (13) *Notoplocaptera taiwanica* nov.sp., holotype ♂, head and thorax dorsal view, (14-17) ditto, paramer in different views (14 = ventral side); (18) *Taiwanaptera glabra* nov.sp., paramer. Scales: Fig. 13 1 mm; Figs 14-18 0.1 mm.



Photos 1-6: (1) *Carventus insularis*, holotype ♀; (2) *Carventus taiwanensis*, ♀; (3) *Taiwanaptera glabra* nov.sp., holotype ♂; (4) ditto paratype ♀, dorsal view; (5) ditto, ventral view; (6) *Notoplocaptera taiwanica*, holotype ♂.